

Strengthening Deterrence for 21st Century Strategic Conflicts and Competition: Accelerating Adaptation and Integration

Annotated Bibliography
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CGSR

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Annotated Bibliography for the Workshop:

**Strengthening Deterrence for 21st Century Strategic Conflicts and Competition:
Accelerating Adaptation and Integration**

Center for Global Security Research, Lawrence Livermore National Laboratory
November 14-15, 2017

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Workshop agenda

Panel 1: A Red-Blue Deterrence Net Assessment: the Euro-Atlantic Context

How does Russian leadership assess the balance of strategies, capabilities, and strategic influence and advantage in Europe today? Looking ahead, does it predict a balance more or less advantageous to Russia? Why? How does NATO assess the balance, present and predicted?

Panel 2: A Red-Blue Deterrence Net Assessment: the Northeast Asian Context

How does China's leadership assess the balance of strategies, capabilities, military advantage, and strategic influence in East Asia today? Looking ahead, does it predict a balance more or less advantageous to China? Why? How does DPRK leadership assess the balance, present and predicted? How should the US and its allies assess the regional balance?

Panel 3: Improving the Integration of Space and Cyber Means to Achieve Decisive Effects

How can space be more effectively integrated into the portfolio of military assets to enable coherent operations, decisive effects, and effective deterrence? Can cyber be more effectively integrated for the same purposes? Should it be? How?

Panel 4: Improving the Integration of Strike and Defense

What are the roles of strike and defense in deterrence strategy and how can their contributions to deterrence be strengthened? What impact will hypersonic capabilities have on deterrence and stability?

Panel 5: Defining the Elements of the Long-Term Competition

How does Russia approach the problem of long-term competition with the United States and the West? How competitive is it likely to be? How does China approach the problem of long-term competition with the United States and its allies? How competitive is it likely to be? What competitive strategies make sense for the United States and its allies today?

Panel 6: Assembling the Future Deterrence Toolkit

How can the United States invest to put itself in a much more competitive position in the future vis-à-vis strategic threats? What lessons for deterrence capabilities and integrated approaches can be learned from DoD technology innovation initiatives aimed at enabling the Third Offset? Should the United States and its allies pursue a division of labor?

Panel 7: Strengthening U.S. and Allied Integration for Deterrence

How can the transatlantic community better integrate efforts to adapt and strengthen deterrence strategies and capabilities? How much can be done inside NATO and how much must be done outside? How can the United States and its allies in Northeast Asia better integrate at the bilateral and trilateral levels to achieve positive deterrence implications?

General Background:

The November 2017 workshop follows a series of LLNL workshops aimed at understanding the dynamics of military competition in multiple domains, some old and some new, and their implications for the strategies, policies, and capabilities of the United States and its allies. A summary of the discussion at the previous workshops is available at these links.

- Jacobson, Eric. *3rd Annual Cross-Domain Deterrence Seminar: Towards Integrated Strategic Deterrence. Summary Report*. Center for Global Security Research and National Security Office, Lawrence Livermore National Laboratory, November 15-17, 2016. https://cgsr.llnl.gov/content/assets/docs/CDD_Report_Nov_2016_FINAL.pdf
- Juarez, Anthony. *2015 Cross-Domain Deterrence Seminar. Summary Report*. Center for Global Security Research, Lawrence Livermore National Laboratory, November 17, 2015. https://cgsr.llnl.gov/content/assets/docs/CDD_Seminar_2015_Report.pdf
- Vince, Robert J. *Cross-Domain Deterrence Seminar Summary Notes*, Center for Global Security Research and National Security Office, Lawrence Livermore National Laboratory, May 1, 2015. <https://cgsr.llnl.gov/content/assets/docs/SummaryNotes.pdf>

In August 2017, CGSR partnered with the Center for the Study of WMD at the National Defense University to explore the requirements of integrated strategic deterrence. The central analytical question addressed in the workshop was: how might it be possible that the whole of the deterrence strategy would become more than the sum of its parts.

- *Exploring the Requirements of Integrated Strategic Deterrence. Workshop Report*. Center for the Study of Weapons of Mass Destruction, National Defense University, Center for Global Security Research, Lawrence Livermore National Laboratory, August 2017. https://cgsr.llnl.gov/content/assets/docs/ISD_Workshop_AAR_pib_080817_FINAL_for_Posting.pdf

Panel 1: A Red-Blue Deterrence Net Assessment: the Euro-Atlantic Context

At its July 2016 summit, NATO reviewed its progress in adapting its deterrence and defense posture to the new Russian challenge and charted a pathway forward. In the summit communique, see paragraphs 33-71.

- *Warsaw Summit Communiqué Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Warsaw, 8-9 July 2016*. http://www.nato.int/cps/en/natohq/official_texts_133169.htm

In spring 2017, the Defense Intelligence Agency released its first comprehensive report on Russian military strategy, doctrine, and capabilities. The report includes a review of both Russian threat perceptions and Russia's diversifying military strategic toolkit.

- *Russia Military Power. Building a Military to Support Great Power Aspirations*, Defense Intelligence Agency, 2017.
<http://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Russia%20Military%20Power%20Report%202017.pdf>

In June 2017, CGSR co-sponsored a conference at Wilton Park in the United Kingdom on the state of the strategic military competition in Europe and what NATO should do about it. The summary of the discussion can be found at:

- *Conference Report: Rethinking Deterrence and Assurance. Western Deterrence Strategies: At an Inflection Point? Wednesday 14 – Saturday 17 June 2017, WP1545*
https://cgsr.llnl.gov/content/assets/docs/WP_1545_Rapporteur_Report_2017.8.10.pdf

In the article published in June 2016, General John Nicholson explains that the risk of war in Europe—of either a land war or a nuclear escalation—is not zero, but NATO's strength and speed—both military and political—generate the necessary options to counter the limited tactical advantages of Russian Federation forces and to prevent conflict.

- Nicholson, John W. "NATO's Land Forces: Strength and Speed Matter." *PRISM*, Vol. 6, No. 2, July 2016. <http://cco.ndu.edu/Publications/PRISM/PRISM-Volume-6-no-2/Article/835046/natos-land-forces-strength-and-speed-matter/>

CSIS reports, published in 2016, focus on recalibrating U.S. Army forces in Europe in light of the security challenges posed by a resurgent Russia and offer recommendations for building a credible and sustainable deterrence posture in Europe over the next decade.

- Hicks, Kathleen H. and Heather A. Conley, et al. *Evaluating Future U.S. Army Force Posture in Europe, Phase I Report*. Center for Strategic and International Studies, February 2016. <https://www.csis.org/analysis/evaluating-future-us-army-force-posture-europe-phase-i-report>
- Hicks, Kathleen H. and Heather A. Conley, et al. *Evaluating Future U.S. Army Force Posture in Europe, Phase II Report*. Center for Strategic and International Studies, June 2016. <https://www.csis.org/analysis/evaluating-future-us-army-force-posture-europe-phase-ii-report>

The Polish Institute of International Affairs paper, from June 2017, demonstrates the two opposite trends in force posture in Europe in the last decade. In contrast to the U.S. and four biggest military spenders from Western Europe, Russia has demonstrated consistency and commitment in shaping its force posture towards high-intensity conventional operations inside the OSCE area.

- Terlikowski, Marcin, et al. "Trends in Force Posture in Europe." *PISM Strategic File*, June 2017. <http://www.pism.pl/Publications/PISM-Strategic-Files/PISM-Strategic-File-no-1-85>

Alexander Velez Green's report, from April 2017, discusses Russia's debate on a doctrine of preemption and recommends steps which U.S. may take to reduce both the perceived value of and perceived need of adoption of such doctrine by Russia.

- Velez-Green, Alexander. *The Unsettling View from Moscow. Russia's Strategic Debate on a Doctrine of Pre-emption*. CNAS, April 2017.
<https://s3.amazonaws.com/files.cnas.org/documents/CNASReport-RussiaStrike-Finalb.pdf?mtime=20170428143631>

Panel 2: A Red-Blue Deterrence Net Assessment: the Northeast Asian Context

Joint Communiqué of the 49th ROK - U.S. Security Consultative Meeting in October 2017, sets the agenda for further development of U.S.- South Korea Alliance.

- *Joint Communiqué of the 49th ROK- U.S. Security Consultative Meeting*. Seoul, October 28, 2017. <https://www.defense.gov/Portals/1/Documents/pubs/20171028-Joint-Communique-OSD-MND-October-17-Final-version.pdf>

An August 2017 Joint Statement of the U.S.-Japan Security Consultative Committee outlines a path forward for the Alliance in addressing the ongoing and emerging threats.

- *Joint Statement of the Security Consultative Committee*. Press Operations Release No: NR-293-17, Aug. 17, 2017. <https://www.defense.gov/News/News-Releases/News-Release-View/Article/1282045/joint-statement-of-the-security-consultative-committee/>

In May 2017, U.S. Department of Defense released the latest Annual Report to Congress on Military and Security Developments Involving the People's Republic of China.

- *Annual Report to Congress. Military and Security Developments Involving the People's Republic of China 2017*. Office of the Secretary of Defense, May 2017.
https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF

In October 2016, CGSR hosted a two-day workshop examining the impact on U.S. and allied deterrence strategy of the emergence of a nuclear-arming North Korea. There was extensive discussion of Kim Jong Un's perceptions of the security environment and his national and nuclear military strategies. See:

- *Deterring a Nuclear-Arming North Korea. Workshop Summary*. Center for Global Security Research, Lawrence Livermore National Laboratory, January 2017.
https://cgsr.llnl.gov/content/assets/docs/CGSR_DPRK_Summary_Report_FINAL.pdf

In March 2017, CGSR hosted a two-day workshop examining the main dynamics in the China-US strategic military relationship. For a summary of those discussions, see:

- *Emerging Challenges in the China - US Strategic Military Relationship*. Center for Global Security Research, Lawrence Livermore National Laboratory, March 2017.
https://cgsr.llnl.gov/content/assets/docs/PRC-US_Summary_final.pdf

The National Institute for Defense Studies, in Tokyo, issues an annual review of key developments with the title *East Asian Strategic Review*. In the 2017 version, see chapters 3 on China, 4 on North Korea, and 7 on the United States.

- *East Asian Strategic Review 2017*. The National Institute for Defense Studies, May 2017. <http://www.nids.mod.go.jp/english/publication/east-asian/index.html>

Shane Smith (2015) has described possible evolutions in North Korea's nuclear strategy and posture as its capabilities mature, emphasizing the ways in which it could pursue a much more ambitious role for its emerging deterrent.

- Smith, Shane. "Implications for US Extended Deterrence and Assurance in East Asia." *North Korea's Nuclear Future Series*. US-Korea Institute, SAIS, November 2015. <https://www.uskoreainstitute.org/wp-content/uploads/pdf/NKNF-Smith-Extended-Deterrence-Assurance.pdf>

In 2006, Joseph Bermudez examines the ways in which political ideology, threat perception, and hatred for the United States combine to inform the strategic culture and military strategy of North Korea. Bermudez, Joseph S., Jr. *North Korea's Strategic Culture*. SAIC, October 2006. <https://fas.org/irp/agency/dod/dtra/dprk.pdf>

A 2017 RAND research report outlines how, as China's nuclear deterrent is being modernized, its emphasis on nuclear deterrence is likely to rise in the coming years, for reasons both external and internal. See especially chapters 4, 6, and 9:

- Heginbotham, Eric, et al. *China's Evolving Nuclear Deterrent. Major Drivers and Issues for the United States*. RAND, 2017. https://www.rand.org/pubs/research_reports/RR1628.html

Panel 3: Improving the Integration of Space and Cyber Means to Achieve Decisive Effects

In August 2016, CGSR hosted a two-day workshop exploring the place of space and counter-space strategies and capabilities in the so-called Third Offset. A key conclusion was that the place is poorly understood by most of those engaged in seeking to strengthen deterrence at the conventional level of war.

- *Space and the Third Offset. Workshop Summary*. Center for Global Security Research, Lawrence Livermore National Laboratory, January 2017. https://cgsr.llnl.gov/content/assets/docs/CGSR_3OS_Summary_Report_FINAL.pdf

A 2017 report discusses the evolution of space as a contested domain, the changing threats to U.S. space systems, deterrence theory and its applications to the space domain, and findings from a space crisis exercise administered by CSIS.

- Harrison, Todd, et al. *Escalation and Deterrence in the Second Space Age*. Center for Strategic and International Studies, October 2017. https://csis-prod.s3.amazonaws.com/s3fs-public/publication/171017_Harrison_EscalationDeterrenceSecondSpaceAge_Web.pdf?ijw7B1l_KJZ_5.GVNHkqvsUkarb3Tp9r

In a 2011 paper, Vincent Manzo explains that there is a lack a shared framework for interpreting how counterspace and cyber-attacks may fit into an escalation ladder during a conflict. It complicates effective U.S. cross-domain contingency planning, undermines deterrence and increases the potential for miscalculation of adversaries.

- Manzo, Vincent. "Deterrence and Escalation in Cross-domain Operations: Where Do Space and Cyberspace Fit?" *Strategic Forum*, National Defense University, December 2011. <http://ndupress.ndu.edu/Portals/68/Documents/stratforum/SF-272.pdf>

Axelrod and Iliev (2014) analyze the optimal timing for the use of cyber resources in future cyber conflict. They offer a mathematical model to clarify how the timing of such a choice can depend on the stakes involved, as well as the characteristics of the resource for exploitation.

- Axelrod, Robert and Rumen Iliev. "Timing of cyber conflict." *PNAS*, vol. 111, no. 4, January 2014. <http://www-personal.umich.edu/~axe/PNAS-2014-Axelrod-1298-303.pdf>

Breuer (2015) explains four principles of cyberspace operations. He highlights that cyberspace must be brought into the planning process at inception. Building an operational plan and then "sprinkling" cyber on after the fact will lead to disjointed operations and effects and will yield nothing but failure.

- Breuer, Pablo C. "Truths of Cyberspace Operation Operational savvy simply cannot be mass-produced." *Chips*, March 2015. <http://www.doncio.navy.mil/chips/ArticleDetails.aspx?ID=5921>

The thesis of Bracken's 2016 article is that cyber war technologies are spilling over into precision strike and nuclear mission areas. The result will transform deterrence and arms race stability and lead to other significant changes.

- Bracken, Paul. "The Cyber Threat to Nuclear Stability." *Orbis*, Vol. 60, Issue 2, 2016, Pages 188-203. <http://www.sciencedirect.com/science/article/pii/S0030438716000077>

While many Western analysts focus on strengthening deterrence in cyber space, Michael Fischerkeller and Richard Harknett (2017) argue that deterrence is not a credible strategy for cyberspace, given unique structural features and operational characteristics of the domain. Instead, they argue, the United States and its allies should pursue a strategy of cyber persistence.

- Fischerkeller, Michael P. and Richard J. Harknett. "Deterrence is Not a Credible Strategy for Cyberspace." *Orbis*, Vol. 61, Issue 3, 2017, Pages 381-393. <http://www.sciencedirect.com/science/article/pii/S0030438717300431>

Fischerkeller has written an article (2017) about the challenges of integrating offensive cyber operations into conventional deterrence, with a particular focus on such operations as part of cost-imposing strategies in pre-crisis and crisis environments.

- Fischerkeller, Michael P. "Incorporating Offensive Cyber Operations into Conventional Deterrence Strategies." *Survival: Global Politics and Strategy*, vol. 59, no. 1, Pages 103-134. <https://www.iiss.org/en/publications/survival/sections/2017-579b/survival--global-politics-and-strategy-february-march-2017-b178/59-1-09-fischerkeller-88f4>

Matthew Caylor (2016) addresses the question of how cyberspace can be leveraged by an adversary to undermine the credibility of extended nuclear deterrence through exploitation of the combination of technical and psychological vulnerabilities inherent to current strategic deterrence systems, personnel, and policies.

- Caylor, Matthew O. "Undermining Extended Deterrence, Bit by Bit." in: *Strategic Deterrence Research Papers, Academic Year 2016*, edited by Mel Deaile and Al Mauroni, USAF Center for Unconventional Weapons Studies, Maxwell AFB, Alabama, August 2016. <http://cuws.au.af.mil/assets/strategic-deterrence-ay16-student-papers.pdf>

In a 2013 article, Warner and Good point out that the best deterrence seems to be the uncertainty of the true costs of a cyber-attack. While states have so far acted cautiously when employing cyber weapons against other states that could potentially retaliate in kind, state-based deterrence does not seem effective at the lower levels.

- Warner, Michael, and Michael Good. "Notes on Deterrence in Cyberspace." *Georgetown Journal of International Affairs*, 2013, pp. 65–72. http://journal.georgetown.edu/wp-content/uploads/2015/07/gjia13006_Warner-CYBER-III.pdf

Panel 4: Improving the Integration of Strike and Defense

In this June 2014 paper published by IFRI in Paris, Brad Roberts sets out the Obama administration's view of the strategic value of ballistic missile defense, including its value for a broad set of deterrence objectives in peacetime, crisis, and war. The analysis also illuminates the ways in which BMD is a complement to strike capabilities, which may prove limited in their effectiveness for technical or political reasons.

- Roberts, Brad. "On the Strategic Value of Ballistic Missile Defense." *Proliferation Papers*, no. 50, June 2014. <http://www.ifri.org/sites/default/files/atoms/files/pp50roberts.pdf>

These 2017 reports set out key questions and offer recommendations to help guide and inform the Trump Administration work on the new Ballistic Missile Defense Review. Among a number of issues, they discuss the role of left of launch capabilities.

- *Missile Defense and Defeat Considerations for the New Policy Review*, edited by Tom Karako. CSIS Missile Defense Project, March 2017. https://csis-prod.s3.amazonaws.com/s3fspublic/publication/170228_Karako_MissileDefenseDefeat_Web.pdf?.oYefXIARU6HCqtRN3Zuq7mKljU3jllq

- Karako, Tom, et al. *Missile Defense 2020. Next Steps for Defending the Homeland*, CSIS Missile Defense Project, April 2017. https://csis-prod.s3.amazonaws.com/s3fs-public/publication/170406_Karako_MissileDefense2020_Web.pdf?rgfZJOoY5AJY5ScsfZQW8z7Bn7dtSlrr

The Atlantic Council's Issue Brief from July 2017 argues that developing an effective counter-offensive campaign capability and strategy against theater ballistic missiles should be an essential part of broader strategy to defend military and civilian targets against ballistic missile attack.

- Kemp, Herbert C. "Left of Launch: Countering Theater Ballistic Missiles." *Issue Brief*, Atlantic Council, July 2017. http://www.atlanticcouncil.org/images/publications/Left_of_Launch_web_0731.pdf

A 2017 analysis by the RAND Corporation of the risks of hypersonic missile proliferation emphasizes the potential value of cooperation among the United States, Russia, and China in hindering such proliferation.

- Speier, Richard H., George Nacouzi, Carrie Lee and Richard M. Moore. *Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons*. RAND Corporation, 2017. https://www.rand.org/pubs/research_reports/RR2137.html

This July 2017 report by Amy Woolf of the Congressional Research Service examines key policy issues related to Conventional Prompt Global Strike and Long-Range Ballistic Missiles, including specifically hypersonic missiles.

- Woolf, Amy F. "Conventional Prompt Global Strike and Long-Range Ballistic Missiles: Background and Issues." *CRS Report*, R41464, July 7, 2017. <https://fas.org/sgp/crs/nuke/R41464.pdf>

Corentin Brustlein's paper published in 2015 highlights some longer-term, operational and strategic issues that might arise in crisis or war in which prompt strike capabilities are used.

- Brustlein, Corentin. "Conventionalizing Deterrence? U.S. Prompt Strike Programs and Their Limits." *Proliferation Papers*, no. 52, January 2015. <https://www.ifri.org/sites/default/files/atoms/files/pp52brustlein.pdf>

Three articles published in 2015 in *the Nonproliferation Review* focus on the strategic implications of conventional prompt global strike, long-range hypersonic weapons, and boost-glide weapons, and analyze the ways in which their development affect relations between U.S., China and Russia.

- Gormley, Dennis M. "US Advanced Conventional Systems and Conventional Prompt Global Strike Ambitions." *The Nonproliferation Review*, Vol. 22, Iss. 2 (2015). <http://www.tandfonline.com/doi/full/10.1080/10736700.2015.1117735>
- Acton, James M. "Russia and Strategic Conventional Weapons." *The Nonproliferation Review*, Vol. 22, Iss. 2 (2015). <http://www.tandfonline.com/doi/full/10.1080/10736700.2015.1105434?src=recsys>

- Pollack, Joshua H. “Boost-glide Weapons and US-China Strategic Stability.” *The Nonproliferation Review*, Vol. 22, Iss. 2 (2015).
<http://www.tandfonline.com/doi/full/10.1080/10736700.2015.1119422>

Panel 5: Defining the Elements of the Long-Term Competition

In a book published in 2012 by Stanford University Press, Thomas G. Mahnken and his fellow contributors explore how theories developed in the Cold War to prevail in long-term competition with the Soviet Union can be adapting to meet the 21st century challenges of long-term competition with China. See especially chapter 2 by Stephen Rosen, which examines the theoretical foundations and practical limits of such competitive strategies.

- *Competitive Strategies for the 21st Century Theory, History, and Practice*, edited by Thomas G. Mahnken. Stanford University Press, 2012.
<http://www.sup.org/books/title/?id=22068>

In a 2014 primer on competitive strategies, Mahnken explains the potential roles of cost-imposing strategies in dealing with long-term challenges in the Asia-Pacific. Mahnken explains that such cost-imposing strategies are in fact one version of a broader set of competitive strategies that can be tailored for different purposes.

- Mahnken, Thomas G. *Cost-Imposing Strategies. A Brief Primer*. Center for a New American Century, November 2014. <https://www.cnas.org/publications/reports/cost-imposing-strategies-a-brief-primer>

Stephen Biddle and Ivan Oelrich examine the competition for the command of the commons in East Asia in their Summer 2016 *International Security* on future warfare in the Western Pacific as China develops anti-access, area-denial capabilities and the United States and its allies respond.

- Biddle, Stephen and Ivan Oelrich. “Future Warfare in the Western Pacific. Chinese Antiaccess/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia.” *International Security*, vol. 41, no. 1 (Summer 2016).
http://www.mitpressjournals.org/doi/pdf/10.1162/ISEC_a_00249

M. Taylor Fravel and Chris Twomey (2015) examine and assess China’s military strategy and conclude that its reported counter-intervention strategy is a myth.

- Fravel, M. Taylor and Christopher P. Twomey. “Projecting Strategy: The Myth of Chinese Counter-intervention.” *The Washington Quarterly*, vol. 37, no. 44 (2015).
http://daveschull.com/wpcontent/uploads/2015/06/The_Myth_of_Chinese_Counter_Intervention_2015.pdf

In this 2017 assessment, Kristin ven Bruusgaard argues that Russia's nuclear threshold is a function of its changing confidence in its conventional forces, among many other factors. The Western debate about "escalate to de-escalate" misses some of the key drivers of Russia's actual nuclear threshold.

- Ven Bruusgaard, Kristin. "The Myth of Russia's Lowered Nuclear Threshold." *War on the Rocks*, September 2017. <https://warontherocks.com/2017/09/the-myth-of-russias-lowered-nuclear-threshold/>

Stephen R. Covington (2016) explains four fundamental cultural pillars of Russian strategic military thought: strategic uniqueness; strategic vulnerability; going to war with all of Russia; and the decisiveness of the initial period of war. Mirror imaging Western approaches and assumptions or relying on weapons capability-centric analysis alone, will not capture how Moscow sees future conflict and war.

- Covington, Stephen R. "The Culture of Strategic Thought Behind Russia's Modern Approaches to Warfare." Belfer Center for Science and International Affairs, Harvard Kennedy School, October 2016. <https://www.belfercenter.org/sites/default/files/files/publication/Culture%20of%20Strategic%20Thought%203.pdf>

Celeste Wallander's paper, published in 2013 by Atlantic Council, argues that the Mutually Assured Destruction concept is neither an adequate nor cost-effective strategy to sustain stability in the twenty-first century. The optimal strategy for the United States and Russia is instead Mutually Assured Stability, a condition in which neither party has the intention or capability to exercise unilateral advantage over the other.

- Wallander, Celeste A. "Mutually Assured Stability: Establishing US-Russia Security Relations for a New Century." Atlantic Council, July 2013. [http://www.atlanticcouncil.org/images/publications/Mutually Assured Stability.pdf](http://www.atlanticcouncil.org/images/publications/Mutually_Assured_Stability.pdf)

In a report published in September 2017 by the Center for New American Security, James N. Miller and Richard Fontaine argue that parallel changes in U.S.-Russian political relations and the military-technological landscape are fundamentally reshaping the ways in which a U.S.-Russian crisis and conflict likely would unfold. They analyze three distinct but related pathways to future U.S.-Russia crisis and conflict.

- Miller, James N.Jr. and Richard Fontaine. "A New Era in U.S.-Russian Strategic Stability: How Changing Geopolitics and Emerging Technologies are Reshaping Pathways to Crisis and Conflict." Harvard Kennedy School Belfer Center for Science and International Affairs, Center for a New American Security, September 2017. <https://s3.amazonaws.com/files.cnas.org/documents/CNASReport-ProjectPathways-Finalb.pdf?mtime=20170918101504>

Panel 6: Assembling the Future Deterrence Toolkit

In October 2013, the Defense Science Board identified high leverage technologies that it judged were not adequately being pursued. Four investment categories were described: coping with parity, achieving superiority through cost-imposing strategies, achieving superiority through enhancing force effectiveness, and anticipating surprise.

- *The Defense Science Board Report on Technology and Innovation Enablers for Superiority in 2030*. Defense Science Board, October 2013.
<http://www.acq.osd.mil/ecp/DOCS/DoDGuidance/DSB2030.pdf>

In July 2015, the Defense Science Board issued a report on strategic surprise, in which it identified potential regrets in eight areas and recommended various actions to avoid strategic surprise.

- *DSB Summer Study Report on Strategic Surprise*. Defense Science Board, Department of Defense, July 2015. <http://www.dtic.mil/dtic/tr/fulltext/u2/1001623.pdf>

In December 2016, the Defense Science Board summarized more than a decade of work on technical challenges and opportunities, and set out seven main priorities for the new administration.

- *Seven Defense Priorities for The New Administration. Report of the Defense Science Board*. Defense Science Board, Department of Defense, December 2016.
http://www.acq.osd.mil/dsb/reports/2010s/Seven_Defense_Priorities.pdf

In January 2017, the Defense Science Board issued an assessment of the Defense Research Enterprise, which recommended steps to maintain and enhance the enterprise through more open innovation and more active participation in the DoD requirements process.

- *Defense Research Enterprise Assessment*. Defense Science Board, Department of Defense, January 2017.
http://www.acq.osd.mil/dsb/reports/2010s/Defense_Research_Enterprise_Assessment.pdf

In this 2013 paper published by the National Institute for Defense Studies in Tokyo, Brad Roberts sets out the Obama administration's comprehensive approach to adapting and strengthening regional deterrence architectures and the emerging challenges for the U.S.-Japan alliance in developing needed future capabilities.

- Roberts, Brad. "Extended Deterrence and Strategic Stability in Northeast Asia." *NIDS Visiting Scholar Paper Series*, no. 1, 2013.
<http://www.nids.mod.go.jp/english/publication/visiting/pdf/01.pdf>

In a follow-on 2016 paper from NIDS, David Arase sets out an agenda for modernizing U.S. defense cooperation in East Asia to peacefully manage strategic competition.

- Arase, David. "Modernizing US defense cooperation in East Asia to peacefully manage strategic competition." *NIDS Visiting Scholar Paper Series*, no. 2, 2016. <http://www.nids.mod.go.jp/english/publication/visiting/pdf/02.pdf>

The requirements of the future U.S. nuclear deterrent are set out in two different 2017 advisory reports to the Trump administration's Nuclear Posture Review, one generated by the National Institute for Public Policy and the other by the Brookings Institution.

- Payne, Keith B. and John S. Foster, et al. *A New Nuclear Review for a New Age*. Fairfax, VA: National Institute Press, 2017. <http://www.nipp.org/wp-content/uploads/2017/06/A-New-Nuclear-Review-final.pdf>
- *Meeting U.S. Deterrence Requirements: Toward a Sustainable National Consensus, A Working Group Report*, edited by Robert Einhorn and Steven Pifer. Brookings Institution, September 2017. https://www.brookings.edu/wp-content/uploads/2017/09/fp_20170920_deterrence_report.pdf

Panel 7: Strengthening U.S. and Allied Integration for Deterrence

Paulauskas shows that the 2016 Warsaw Summit was an important waypoint towards a strengthened NATO deterrence and defense posture. As work progresses, NATO will need to address many challenges, including ensuring overall coherence of its evolving deterrence and defense posture.

- Paulauskas, Kestutis. "On Deterrence." *NATO Review*, 2016. <http://www.nato.int/docu/review/2016/Also-in-2016/nato-deterrence-defence-alliance/EN/index.htm>

Ringsome and Rynning (2017) argue that NATO advances, in terms of its deterrence posture, have merely brought into focus more complex challenges related to its force structure, command structure and diplomatic strategy. To succeed in the long run, NATO must steer clear of the easy answers that can be found in stringent response plans, budgets for burden-sharing or the minutiae of deterrence theory.

- Ringsmose, Jens and Sten Rynning. "Now for the Hard Part: NATO's Strategic Adaptation to Russia." *Survival*, Vol. 59 , Iss. 3 (2017). <http://www.tandfonline.com/doi/full/10.1080/00396338.2017.1325603?src=recsys>

In a 2017 paper published by GLOBSEC, Cornish argues that NATO's integrated deterrence should have four elements: vertical integration, horizontal integration, functional integration and temporal integration.

- Cornish, Paul. "Integrated Deterrence: NATO's 'First Reset' Strategy." *GLOBSEC NATO Adaptation Initiative Supporting Paper*, 2017. <https://www.globsec.org/wp-content/uploads/2017/09/gnai - integrated deterrence.pdf>

In a paper published in November 2016, Manzo and Miles argue that “appropriate level of integration” between nuclear and conventional planning and operations is essential for effective deterrence.

- Manzo, Vince A. and Aaron R. Miles. “The Logic of Integrating Conventional and Nuclear Planning.” *Arms Control Today*, November 2016.
- https://www.armscontrol.org/ACT/2016_11/Features/The-Logic-of-Integrating-Conventional-and-Nuclear-Planning

Daniel Lindsey (2016) analyzes the role of dual capable aircraft (DCA) in nuclear operations and propose a framework by which to best integrate them into a new joint nuclear doctrine.

- Lindsey, Daniel. “The Need for Joint Doctrine” in: *Strategic Deterrence Research Papers, Academic Year 2016*, edited by Mel Deaile and Al Mauroni, USAF Center for Unconventional Weapons Studies, Maxwell AFB, Alabama, August 2016.
<http://cuws.au.af.mil/assets/strategic-deterrence-ay16-student-papers.pdf>

Green and Kroenig (2017) argue that rather than preparing for diplomatic or warfighting scenarios with a nuclear-armed North Korea, the United States should be preparing for a sustained period of deterrence, coercive diplomacy, and rollback.

- Green, Michael J. and Matthew Kroenig. “A New Strategy for Deterrence and Rollback with North Korea.” *War on the Rocks*, October 2017.
<https://warontherocks.com/2017/10/a-new-strategy-for-deterrence-and-rollback-with-north-korea/>

Warden (2017) highlights that to deter Pyongyang, coordination is key, hence the need for the United States and its allies to adopt a layered deterrence strategy and determine courses of action that, if pursued vigorously and carefully, would increase their chances of containing a nuclear-armed North Korea and avoiding nuclear war.

- Warden, John K. “North Korea’s Nuclear Posture: An Evolving Challenge for U.S. Deterrence.” *Proliferation Papers*. Ifri, March 2017.
https://www.ifri.org/sites/default/files/atoms/files/warden_north_korea_nuclear_posture_2017.pdf

Three Congressional Research Service reports provide an overview of main issues in U.S. relations with Japan and South Korea, and missile defense in the Asia-Pacific, including challenges, risks, and opportunities related to U.S.-Japan-South Korea increased trilateral BMD Cooperation.

- Rinehart, Ian E., et al. “Ballistic Missile Defense in the Asia-Pacific Region: Cooperation and Opposition.” *CRS Report*, R43116, April 2015.
<https://fas.org/sgp/crs/nuke/R43116.pdf>
- Chanlett - Avery, Emma, et al. “Japan-U.S. Relations: Issues for Congress.” *CRS Report*, RL33436, February 2017, <https://fas.org/sgp/crs/row/RL33436.pdf>
- Manyin, Mark E. “U.S. - South Korea Relations.” *CRS Report*, R41481, May 2017.
<https://fas.org/sgp/crs/row/R41481.pdf>

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